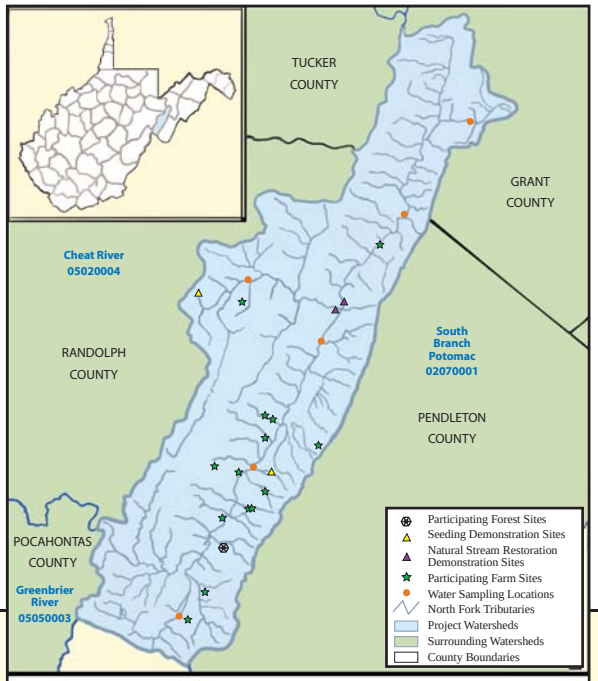
EPA United States Environmental Protection Agency

The North Fork Potomac Watershed Story

Background

Water in the North Fork of the South Branch of the Potomac River had high levels of fecal bacteria primarily from rain or snow-melt running off of beef and poultry farms. As a result, landowners, environmental organizations, universities, and government agencies worked together to improve water quality. Because of this partnership, the stream no longer exceeds listing criteria for the list of impaired or polluted surface waters in West Virginia (WV).



EPA Clean Water Act Section 319 project sites

North Fork, of the South Branch of the Potomac River:

- Is located in Pendleton and Grant Counties, WV and Highland County, Virginia.
- Is a scenic trout stream.
- The area is mountainous with mainly forests and beef and poultry farms.
- Many of the animal feeding areas and poultry operations are in the narrow valley bottoms and floodplains next to the streams.
- More poultry litter and animal manure is generated than can be applied to fields at acceptable agronomic rates.

Problem

The headwaters of the Potomac River, including the North Fork watershed, are a valuable environmental and economic resource of eastern WV. The waters of the region are generally of good quality, however, the visible effects of pollution began to be noticed in the 1980's. Large algal blooms in the streams were observed and high bacterial counts became more common. It was also evident that more and more poultry farms were coming into the area. While the Potomac watershed historically produced beef cattle, food for livestock, timber, and some corn and apples, a significant increase in the poultry industry began in the early 1990's. Between 1993 and 1996 alone, the number of poultry farms doubled. With less and less land available to manage them, biosolids (litter from chicken houses containing manure and manure from other animals) were being improperly handled. A U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) study found that farmers were improperly storing and over-applying biosolids to fertilize their soils. This led to an excess of nutrients, particularly phosphorus, which the crops could not absorb. Rainwater carried the excess wastes into the streams, polluting them.

Solution

In 1993, this area became part of the USDA Water Quality Initiative, a federally sponsored program to address water pollution from farms. The WV legislature appropriated $250,000 to support the initiative. Federal and state agencies, the WV Poultry Water Quality Advisory Committee, and the Potomac Valley Conservation District participated. The goal was to protect and improve water quality in the Potomac River through voluntary changes made by farmers. Technical and financial assistance were provided. In the summer of 1994, a Potomac Interagency Water Quality Office was established in Moorefield, WV to look at agricultural water quality issues within the headwaters area. This office included staff from the WV Conservation Agency, NRCS, and the WV University Cooperative Extension. Funding to support the Conservation Agency staff was provided through an EPA Nonpoint Source Program Clean Water Act Section 319 grant. Initially, the emphasis was on nutrient and animal waste management. Later, improved pesticide management and reduction of bacterial contamination were added.

A surface-water testing program conducted in 1994 and 1995 by the U.S. Geological Survey (USGS) and funded by the NRCS showed that several streams in the South Branch watershed were being polluted by fecal bacteria. It was also found that the highest levels of pollution were in areas having the highest number of feedlots and poultry houses. In 1996, the North Fork, South Fork, South Branch, Lunice Creek, Mill Creek, and Anderson Run were put on the federal Clean Water Act-Section 303(d) list of state "impaired" waters.

BEFORE

Figure 1. An animal feed lot that allowed run-off of contaminants into the nearby stream

Much needed funding for animal waste management became available in 1997 to help reduce pollutant runoff in the Upper Potomac River Basin. In January, the NRCS land-treatment watershed cost-share program (originally a flood and sediment control program) became available. Also in 1997, farmers and producers in the Potomac headwaters area began to use Clean Water Act State Revolving Funds as a source of low interest (2%) loans to finance Best Management Practices (BMPs) to reduce nonpoint source impacts on water quality. This Agricultural Water Quality Loan Program provides funds to supplement other cost-share programs, or to finance stand-alone BMPs or equipment. This pilot program was set up as a cooperative effort among the WV Department of Environmental Protection (DEP), WV Conservation Agency, NRCS, the Potomac Valley Conservation District, and local banks.

In 1998, the NRCS began working with the North Fork Watershed Association, a local citizen's group concerned about recurring flooding. A watershed management plan was developed that identified various practices to lessen damage from flooding and improve water quality. The group also developed an Environmental Quality Incentives Program (EQIP) proposal to implement sections of the plan, which was not funded. This EQIP proposal was enhanced to be more comprehensive and later submitted and implemented as a 319 nonpoint source watershed project.

AFTER

Figure 2. A new animal feed lot (same location) that is covered and has a concrete pad and adequate buffer

Total Maximum Daily Loads Developed

Several streams of the South Branch watershed, including the North Fork, were listed in 1996 by the WV DEP as being impaired. This required establishment of Total Maximum Daily Load (TMDL) allocations for fecal coliform, which was done in 1998. TMDLs are a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards for the designated uses.

Computer models were used to determine the sources of pollution in the area, including leaking septic systems. The models found that agriculture was the major source of fecal coliform in the North Fork watershed and that a 36.1% reduction from agricultural land was necessary for the stream to achieve state water quality standards.

Grants Foster Broader Partnerships

An EPA Clean Water Act Section 319 Nonpoint Source Pollution grant was awarded in 2000 to the WV Conservation Agency (WVCA) through the WV DEP on behalf of the North Fork Watershed Association. This grant funded the work to address problems from agricultural activities, past timbering operations, stream bank erosion, and road maintenance.

BEFORE

Figure 3. Cows grazing by a stream

A project coordinator, employed by the WVCA and originally hired with 319 funds in 1993, does outreach by educating the public, networking, sending information to the news media, and coordinating meetings between landowners and the North Fork Watershed Association and its many partners. Partners in the effort include the Potomac Valley Conservation District, WVCA, WV University Cooperative Extension, WV DEP, WV Division of Forestry, WV Division of Highways, USDA NRCS, and Trout Unlimited. Additional Clean Water Act Section 319 Nonpoint Source Grants have followed for a total of $992,000. The USDA has contributed almost $550,000 to improve management practices, with the state of WV providing additional funds.

The NRCS provides technical assistance for planning, design, and implementation of projects under these grants.

Best Management Practices

A range of BMPs has been established to control runoff from feedlots and eliminate or reduce cattle access to the streams (see Figures 3 and 4). They include:

- Fencing along stream banks
- Relocating feedlots away from streams
- Constructing roofs over feeding areas
- Stabilizing feeding areas and cattle access areas
- Constructing animal waste storage facilities
- Planting vegetation along stream banks
- Establishing riparian buffers
- Developing alternative livestock watering facilities and drilling livestock water wells
- Stabilizing critically eroding areas
- Rotational grazing systems with intra-pasture fencing systems and alternative watering facilities
- Constructing poultry litter storage sheds, waste composting facilities and composters for dead chickens

AFTER

Figure 4. Fencing to keep cows away from the stream and a vegetative strip to filter and slow runoff

Water Quality Initiatives and Other Activities

Prior to 1993, very few agricultural producers within the Potomac headwaters region developed or used nutrient management plans to prevent over application of manure and commercial fertilizers to crop and pasture land. Several nutrient management initiatives were funded by special USDA appropriations between 1993 and 2001. The focus was on collecting data and developing monitoring techniques for nitrogen and phosphorus to assess and reduce the risk of nutrients finding their way to surface waters. Technical support was provided for soil testing, litter/manure analyses, and manure spreader calibration as part of developing a nutrient management plan. Now, nutrient management plans have been developed for all poultry and most of the livestock farms. Even though the emphasis of nutrient management plans has been to reduce the risk of nitrogen and phosphorus delivery to surface waters, a subsequent effect has been a significant reduction of fecal coliform, other pathogens, and organic loads to those same waters.

Nutrient Management Laboratory

In 1994, a nutrient management laboratory was opened to assist agricultural producers with nutrient management planning. This lab provides free analyses of manure and poultry litter. The results are used to prepare site-specific nutrient management plans and to market the litter as fertilizer based on its nutritive value.

A nutrient management planner certification program was developed and implemented in conjunction with WV Department of Agriculture, WV University Cooperative Extension, WV Conservation Agency, NRCS, American Society of Agronomy, and the Soil and Water Conservation Society.

Dead Bird Composting

At the start of this initiative, area producers buried dead birds in pits. However, an EPA-funded demonstration of a dead bird composter in 1993 has resulted in composting being used as the predominant management method.

Poultry Litter Sales

Educational meetings have been held to promote the use of poultry litter for fertilizer throughout the region. To improve the market link between litter producers and potential users of litter, a toll-free Potomac poultry litter marketing hotline was started in 1996 with financial support from the Potomac Headwaters Resource Conservation and Development Area, and the Potomac Valley Conservation District. The result has been the export of significant amounts of litter out of the watershed.

Poultry Litter Transfer

A pilot poultry litter transfer program was initiated in 2001 between the WV Department of Agriculture, WVCA, and Pilgrim's Pride (formerly Wampler Longacre Foods). Poultry producers with excess litter were put in touch with farms in the region that could utilize the litter as a fertilizer. Wampler Foods provided a $30,000 grant and the WV Governor's office provided $45,000 for cost share to transport the litter.

Figure 5. Poultry litter on a floodplain

AFTER

Figure 6. Composting litter in a paved and covered shed

Poultry Litter Composting

In 1996, a poultry litter composting demonstration educated poultry producers and other interested parties about the production of high quality, value-added compost from poultry waste. The composter uses poultry litter combined with wood product waste (such as sawdust, shavings, and bark) to produce a valuable soil amendment. A local company that produces landscape mulch adopted the technology and is currently buying poultry litter and composting it with hardwood waste products, and selling the product to urban markets. This moves excess litter outside the watershed, transforming it from a possible pollutant to an environmental and economical benefit. A side benefit of this effort is the use of forest product waste that otherwise would not be recycled.

Pesticide Waste Collection Program

A four-county pesticide roundup was sponsored in the initiative project area. The orchardists in the area had accumulated a wide variety of outdated pesticides and could not dispose of them legally. In a three-day sweep, more than 30 tons of chemicals were picked up for proper disposal thus reducing the potential contamination of surface and groundwater from improper disposal.

Forestry and Logging Conservation

The WV Division of Forestry has worked with landowners in the watershed to install forestry BMPs. One severely eroded, steep, hillside demonstration site has been planted with trees and fenced for livestock exclusion as part of a reforestation project. Clean Water Act Section 319 nonpoint source funds were used for this effort. Recently obtained, USDA Enhanced Conservation Reserve Program funds are being used to augment similar efforts in the watershed.

Highway Best Management Practices

The WV Division of Highways (DOH) cooperated by implementing a variety of BMPs including road-bank seeding using poultry litter as fertilizer, a sediment erosion control workshop for Highway employees, and construction of a "roadkill" composting facility on DOH property. This composting facility allows DOH to recycle nutrients as a fertilizer and soil amendment for use on roadside seeding and wildflower plantings.

Stream Channel Restoration

Using 319 funds through the WV DEP, the WV Conservation Agency worked with Trout Unlimited, U.S. Fish and Wildlife Service, and the Conservation District on a stream channel restoration effort near Seneca Rocks Scenic Area on the main stem of the North Fork River. The project was designed by Trout Unlimited and uses natural stream channel design technologies (such as planting vegetation) to control erosion, reduce sedimentation, and re-establish riparian and aquatic habitat.

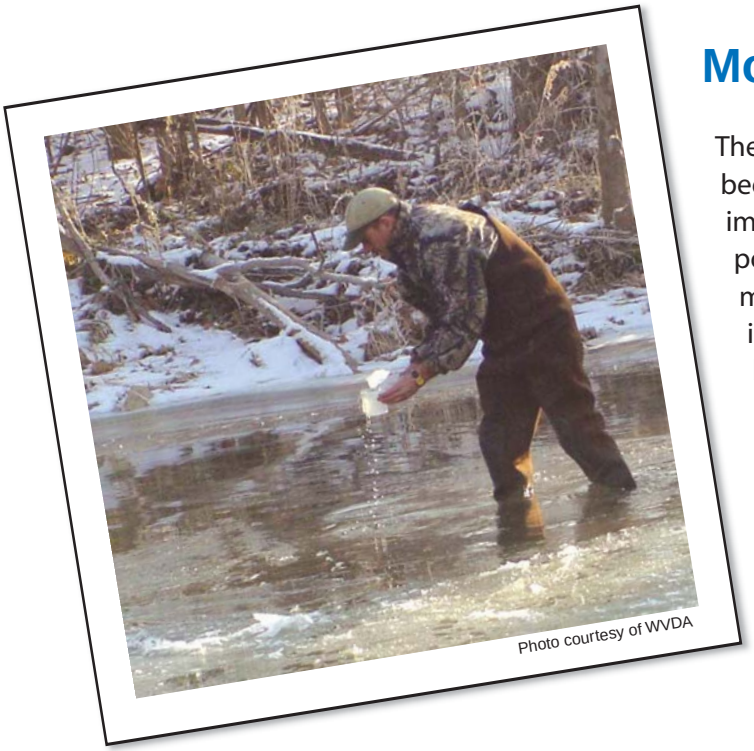
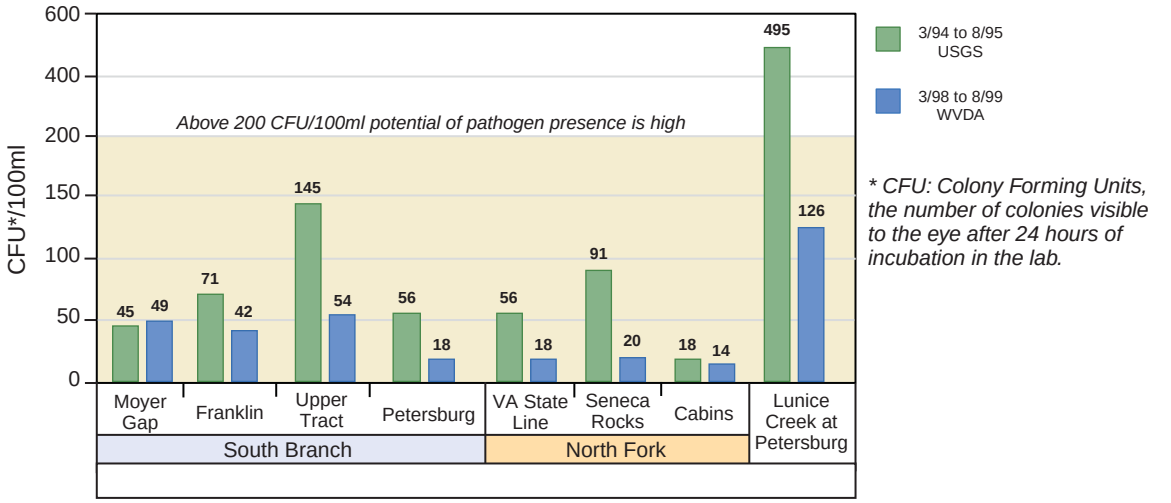


Photo courtesy of WVDA

Monitoring/Results

The agricultural community within the watershed has been extremely receptive, with over 85% of the farmers implementing BMPs. As a result, thousands of tons of poultry litter and cow manure are now being properly managed, no longer polluting runoff that finds its way into the river. Water quality monitoring conducted by the WV Department of Agriculture has shown significant declines in fecal coliform levels. Based on recent water quality monitoring results and the extent of BMPs in the area, the North Fork River has improved such that if DEP were evaluating this information for listing purposes today, the stream would not have been included on the WV 303(d) list.



** CFU: Colony Forming Units, the number of colonies visible to the eye after 24 hours of incubation in the lab.*

Figure 7. Comparison of median fecal coliform levels before and after installation of Best Management Practices

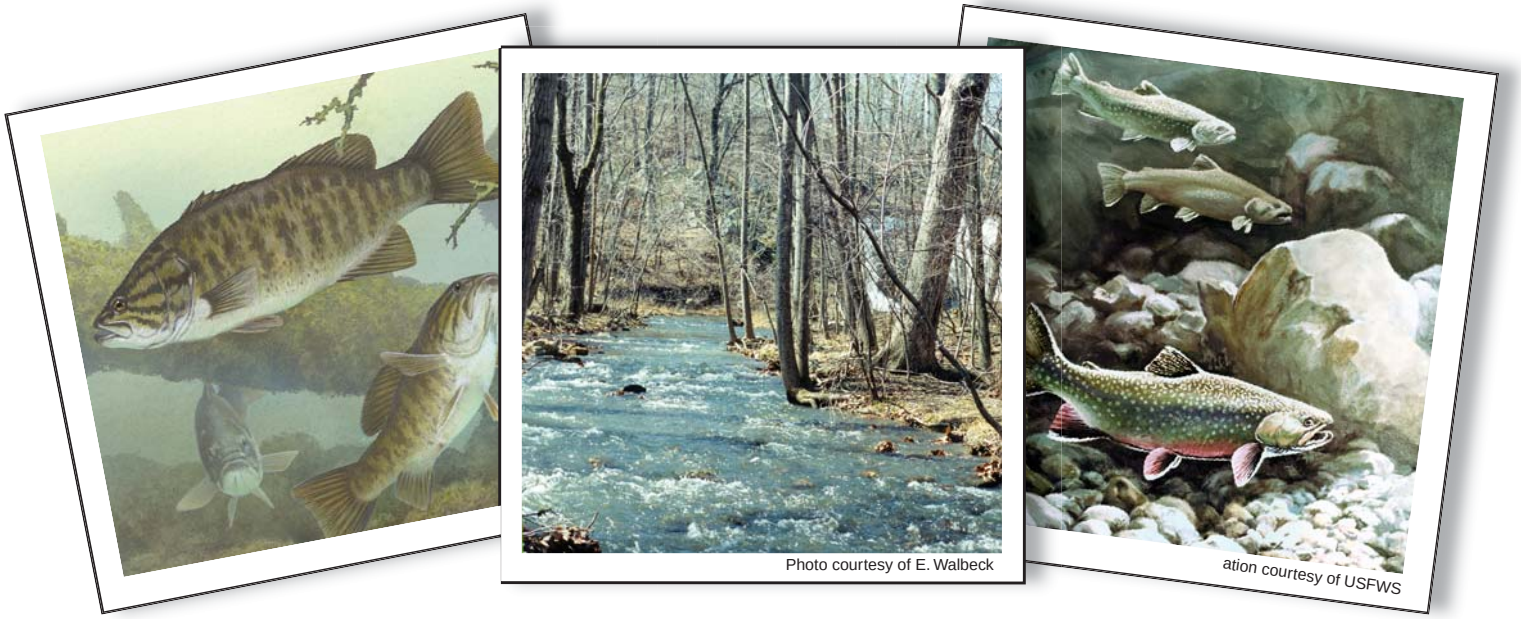


Photo courtesy of E. Walbeck

ation courtesy of USFWS

Ongoing and Future Projects

- A watershed and water quality educational display for the Monongahela National Forest Service, Seneca Rocks Visitors Center.
- Training for landowners on stream channel protection and maintenance.
- WV Department of Agriculture water quality sampling and testing at its Moorefield Water Quality Testing Laboratory.
- The federal Farm Bill's EQIP, Wildlife Habitat Incentives Program (WHIP) and Conservation Reserve Program (CRP) will fund agricultural related BMPs or conservation practices such as erosion and sediment control, runoff management, nutrient management, buffers, pesticide handling control, and pasture management.
- Existing BMPs will continue along with periodic spot checks on performance.

Partnerships and Coordination

Twenty organizations worked together to improve the water quality in the North Fork Potomac watershed. Initial Potomac headwaters Water Quality Initiative Partners are noted below with an asterisk.

North Fork Watershed Association	WV Conservation Agency*
Participating Farmers/Landowners	WV Department of Agriculture*
Pilgrim's Pride/Wampler-Longacre Foods	WV Department of Highways
Potomac Headwaters RC & D Council*	WV Department of Environmental Protection*
Potomac Valley Conservation District*	WV Division of Forestry
Trout Unlimited	WV Farm Bureau
USDA Farm Service Agency	WV Poultry Water Quality Advisory Committee
USDA Natural Resources Conservation Service*	WV Poultry Association
U.S. Environmental Protection Agency	WV University College of Agriculture and Forestry*
U.S. Geological Survey	WV University Extension Service*

EPA Region 3
Philadelphia, PA 19103
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The EPA Region 3 Water Protection Division is responsible for the management and implementation of the region's programs to protect, preserve and enhance water resources. The Division administers programs authorized by the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). Along with the administration of programs, the Division assists the Mid-Atlantic states, localities and interstate commissions in developing comprehensive environmental programs for the achievement of environmental and public health goals and standards and oversees delegation of programs and state implementation of delegated programs.

The Mid-Atlantic Integrated Assessment (MAIA) is a research, monitoring, and assessment program in the Mid-Atlantic region. MAIA is a partnership of federal, state and local governments; non-governmental organizations (NGOs); and academic institutions. MAIA's goal is to provide integrated scientific knowledge to support the environmental decision-making process for the Mid-Atlantic region. This includes development and implementation of multi-scale monitoring designs, scientific tools, and high-quality data.

Fred Suffian
suffian.fred@epa.gov
215-814-5753

U.S. Environmental Protection Agency
Region 3
1650 Arch Street
Philadelphia, PA 19103-2029
www.epa.gov/region3

Patricia Bradley
bradley.patricia@epa.gov
410-305-2744

U.S. Environmental Protection Agency
Mid-Atlantic Integrated Assessment
Environmental Science Center
701 Mapes Road
Ft. Meade, MD 20755-5350
www.epa.gov/maia

Teresa Koon
tekoon@wvdep.org
304-558-3614

WVDEP Division of Water and Waste Management
Nonpoint Source Program
414 Summers Street
Charleston, WV 25301
http://www.wvdep.org/dwwm

Patrick Bowen
patrick.bowen@wv.usda.gov
304-457-4516 ext. 105

U.S. Dept of Agriculture
Natural Resources Conservation Service
USDA-NRCS-East Area Office
Rt. 4, Box 503
Phillippi, WV 26416
www.wv.nrcs.usda.gov

David Raines
draines@wvca.us
304-558-2204

WV Conservation Agency
1900 Kanawha Boulevard, East
Charleston, WV 25305-0193
http://www.wvca.us

John Wagoner
304-822-5174

Potomac Valley
Conservation District
500 East Main Street
Romney, WV 26757
http://www.wvca.us